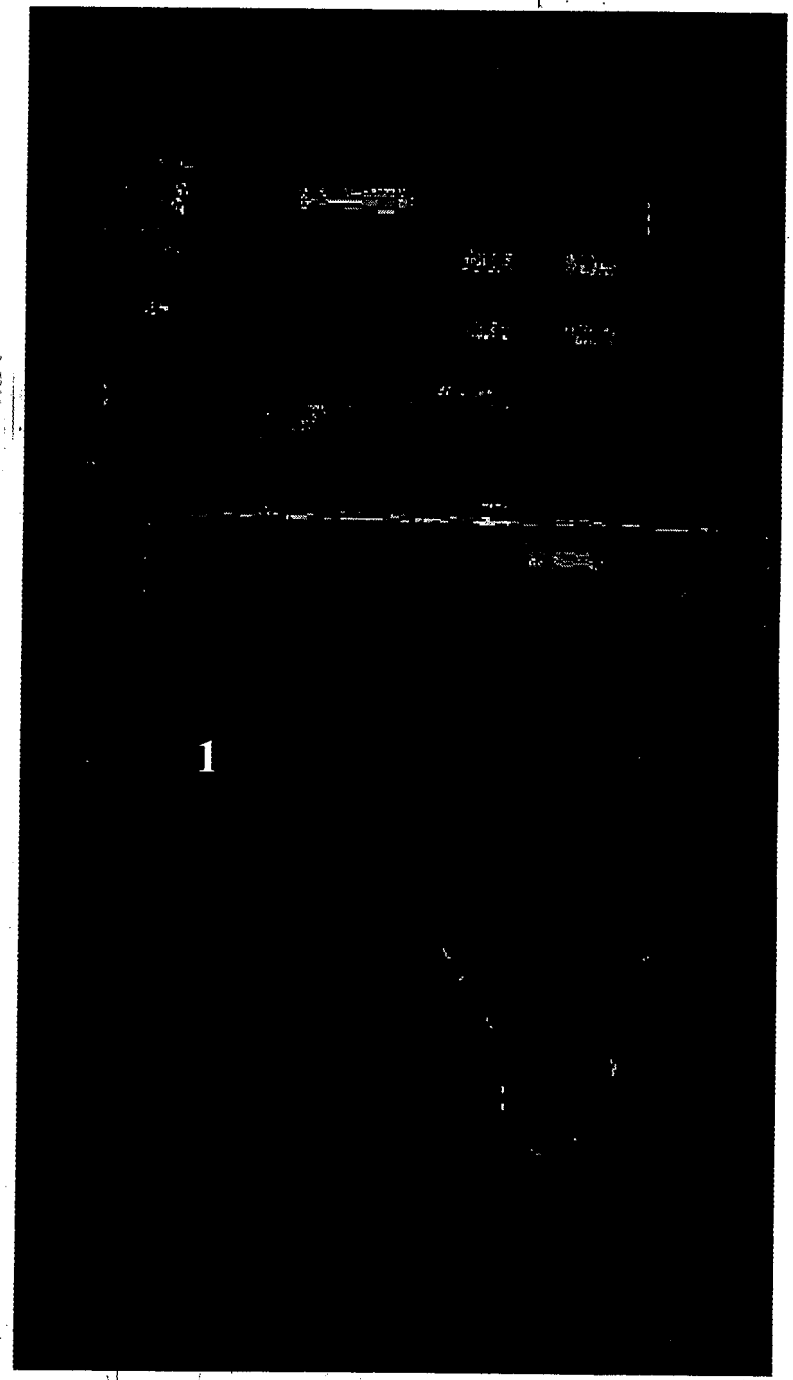
Quick Set-Up Guide

Prepare the system for use:

- ✓ Turn on power
- ✓ Open oxygen valve
- ✓ Hang 1 Liter 0.9% Normal Saline
- ✓ Open cartridge and tubing package
- ✓ Press LOAD button on touch screen
- ✓ Open compartment door

Begin the procedure: (see diagram)

1. Load AO Cartridge in compartment and close door
2. Align IV tubing in slot
3. Spike 1 Liter 0.9% Normal Saline
4. Plug transducer into jack and press PREP
5. Position draw side tubing into blood pump; ensure that tubing is aligned in the "V" shaped brackets of the upper track before closing.
6. Position draw side tubing in the draw lock mechanism (use **blue** lock release button to open lock)
7. Position return tubing in detectors without stretching or pulling. Latch doors.
8. Position tubing in return side lock (use **blue** lock release button to open mechanism)
9. After the SHEATH, GUIDE and MI-Catheare in place, connect the draw side connector to the side port of the SHEATH (see illustration). Press the **green** PRIME button.
10. Tap the inline draw and return transducers during prime to remove air bubbles.



P/N 30023D

Quick Set-Up Guide

1. Analyze patient's pO_2 (baseline pO_2 must be $\geq$ 80 mmHg)
2. Place introducer sheath, guidewire, and guide catheter
3. Track MI-Cath infusion catheter over guidewire to targeted site
4. Make patient draw side connection
5. Press the **green** PRIME button & flick the transducers when blood has entered the circuit
6. After priming the AO Catrridge, make patient return side wet-to-wet connection (red connector)
7. Select appropriate pO_2 range on monitor and enter
8. Monitor and update pO_2 range every 30 minutes
9. Remove the MI-Cath and guide catheter immediately after the procedure

DownStream AO System – Frequently Asked Questions (FAQ)

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	Topic	Question	Answer
1	Set Up	When does the O_2 bottle need to be changed?	We recommend changing the bottle when the pressure drops below 800 psi. The system will not run if the bottle pressure drops below 600 psi.
2	Set Up	Should the AO System be plugged in prior to start-up?	Yes. The system has only 1 hour of battery backup power. Therefore, the system must be plugged into AC power when in the cardiac catheterization laboratory (CCL), unplugging only if transportation is necessary. The system should be plugged in when not in use.
3	Set Up	What does it mean if a green screen appears with BP01, MC02, or EE03 on system start-up?	Occasionally, a green error screen will appear within one minute after the system starts up. This is caused by an internal communication error that is cleared by turning the system off, and then back on.
4	Set Up	Why do I need to use only the specified MI-Cath infusion catheter as the infusion device?	This catheter ensures bubble-free delivery of hyperoxemic blood.
5	Set Up	Why do I need to have a 2F size difference between the sheath and guide catheter for the "co-axial" set-up?	A 2F difference between the sheath and the guide catheter provides the necessary flow area for drawing blood at 75 ml/min without excessively negative draw pressures. An 8F/6F sheath/guide catheter configuration is recommended for "co-axial" set-up.
6	Set Up	Where should the infusion catheter tip be placed during treatment?	TherOx's recommendation is to place the marker band at the proximal edge of the stent.
7	Set Up	What can I use as physiologic solution?	Use 0.9% Normal Saline.
8	Set Up	How should I remove the cartridge from the tray?	Handle the cartridge with dry hands. The transducer jack ("phone jack") can be affected by moisture, particularly saline. Once the cartridge tray is opened, pull the cartridge out gently using the larger PVC tube (1/4" tube). DO NOT PULL ON THE WHITE TUBE. Remove the white plastic clips on the top and bottom of the cartridge after the cartridge is out.

DownStream AO System – Frequently Asked Questions (FAQ)

	Topic	Question	Answer
9	LOAD	What is the recommended load sequence?	Push LOAD on the screen, open the cartridge door, insert the cartridge, and close the door. Once the door is closed, the PREP screen will appear. Continue the load sequence by spiking the bag and connecting the transducer to the transducer jack. Once the transducer is plugged in, press PREP and continue loading the PVC tubes in the blood pump, blood clamps, and the two flow probes (see Questions 10 through 12).
10	LOAD	What do I do if the cartridge does not load easily?	If the cartridge is not loaded within 30 seconds, you will need to press LOAD again because there is a timeout on loading. This is why the recommended LOAD sequence is to first load the cartridge and close the door.
11	LOAD	How should the return tube be loaded into the two flow probes?	First, open the doors of both flow probes. The return tube from the loaded cartridge should hang freely right in front of the probes. Push the tubing into each probe with your thumb until the tube is well seated (i.e., is bottomed in slot). DO NOT STRETCH THE TUBE WHILE LOADING. Latch and unlatch each probe door once to help seat the tubing before latching a final time.
12	LOAD	How should the draw tube be loaded into the blood pump?	After the cartridge has been loaded and the door closed, open the blood pump head and feed the tubing in. With mild tension on the draw tubing, verify that the tube rests in the "V" of the forks on both sides of the pump head, and then close the pump head. The collar on the draw tubing should be completely outside the pump head on the right side.
13	PREP	How long does it take for the cartridge to Prep?	It takes approximately 3.5 minutes.
14	PRIME	How long does it take to blood prime the cartridge?	It will take about 60 seconds until the cartridge return tube is primed and can be wet-connected to the infusion catheter. If the priming sequence takes longer than 99 seconds, the blood pump will stop. Releasing and pressing the PRIME button will restart PRIME.
15	PRIME	What happens if I release the PRIME button during PRIME?	The blood pump stops if the PRIME button is released during PRIME unless blood flow is already above 50 ml/min. Pressing the PRIME button again will restart PRIME.

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	Topic	Question	Answer
16	PRIME	Do I need to tap the pressure transducers during PRIME?	Yes. Both transducers should be tapped firmly by hand (or gently with a harder object) once blood flow has reached the transducer. This will release any bubbles that may be trapped inside the probe during PRIME. Tapping the return transducer is especially important, since a bubble released from there can cause a shut down later in the case.
17	PRIME	Should I have a message in yellow "checking tube fit," before and during PRIME?	Yes. This message will clear once blood flow reaches the flow probes.
18	PRIME	What if the yellow 'checking tube fit' message does not clear when blood flow reaches the flow detectors?	Release the PRIME button. Reload the return tube through both detectors and restart PRIME by pressing the PRIME button.
19	PRIME	What do I do if the red 'reload top detector' message appears during PRIME?	Release the PRIME button. Reload the return tube in the top detector, and restart PRIME by pressing the PRIME button.
20	PRIME	What do I do if the return pressure climbs to 2000 mmHg during PRIME and the pump stops?	Release the PRIME button and unload the cartridge. Verify the infusion catheter hemostasis valve is not over-tightened. Load a new cartridge and verify tube set and infusion catheter are free of kinks before initiating PRIME.
21	AO OFF	What is the AO System doing when PRIME is completed?	When the screen changes at the end of PRIME the system is in AO OFF mode. Normoxic arterial blood is circulating at 75 ml/min, but no AO infusion is taking place.
22	TIME OUT	What do I do if the TIME OUT screen appears after the wet connect has been made?	Nothing. This screen can appear when blood flow drops below 50 ml/min after the wet connect. Since the blood pump is turning, the system will recover on its own.
23	Transport	When can the patient be transported with the AO System? Can the patient be transported after AO ON has been initiated?	The patient may be transported after the PRIME sequence is completed. Transport should be conducted in AO OFF mode only. If the system is in the AO ON mode, push AO OFF on the touch screen prior to moving the patient. AO ON can be restarted once the patient is at the location where the 90-minute infusion will be completed.

DownStream AO System – Frequently Asked Questions (FAQ)

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24	AO ON	Why is it important to have the correct pO_2 range entered into the AO System for AO ON?	The system uses the patient arterial pO_2 value to adjust AO concentration and ensure that the blood pO_2 returned to the patient is hyperoxemic (greater than 760 mmHg) but not above 1000 mmHg.
25	AO ON	What do I do if the AO System gives me an error message?	Refer to AO System User Manual for explanation of error messages
26	AO ON	What do I do if I see the bubble volume rising?	Check the draw tubing/sheath connection, the sample port, and the draw transducer and ensure that these connections are airtight. The AO System will stop the procedure if the bubble volume reaches 10 microliters during the 90-minute infusion.
27	AO ON	Can blood sampling lead to increased bubble volume on the AO System?	Yes. It is important during sampling to follow the sampling technique in the IFU, and not to leave the sample port open or unprimed at any time, because negative pressures can produce microbubbles.
28	AO ON	What is the return flow rate into the patient?	The hyperoxemic blood flow rate is 75 ml/min, which is combines 72 ml/min of patient arterial blood with 3 ml/min of AO solution.
29	End Procedure	Does the AO System alert me that the procedure has ended?	Yes, an audible signal will sound from the system upon completion of the 90-minute procedure. Blood circulation will continue in AO OFF mode. End Procedure must be pressed twice to stop the pump and unload the cartridge.
30	UNLOAD	What is the recommended unload sequence?	Stop the system by pressing "End procedure" twice. Close the blue and the red tubing clamps. Disconnect the tubing from the patient. Unload the PVC tubes out of the blood pump, clamps, and flow probes. Press UNLOAD, open the cartridge door and pull the cartridge out of the compartment. Discard the cartridge and close the cartridge compartment door.
31	GENERAL	What is the ratio of saline to blood in return flow?	Four percent of the return flow is saline. The total volume of saline infused is approximately 270 ml during the 90-minute procedure.

DownStream AO System – Frequently Asked Questions (FAQ)

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32	GENERAL	How many patients can be treated from a standard E-bottle?	A full E-bottle should last for at least 100 cases. Each cartridge uses about 10 psi in E-bottle pressure (mostly from initial pressurization). If bottles are being used more frequently, make sure that the bottle valves are being closed after use, because they can leak.
33	GENERAL	Is the blood cooled by the hyperoxemic treatment?	The blood is not actively cooled, but its temperature does drop as a result of heat loss through the tubing set. The return blood temperature increases in the patient's body as it flows through the infusion catheter. At the infusion catheter tip, the blood temperature is 33° - 35°C.
34	GENERAL	What is the priming volume of the AO Cartridge?	Approximately 60 ml.
35	GENERAL	Does AO Therapy cause the formation of oxygen free radicals (reactive oxygen species)?	There is no evidence that AO Therapy catalyzes oxygen free radical formation. Pre-clinical studies of AO Therapy in acute MI models suggest that reactive oxygen species levels may be reduced.

THEROX

Downstream® AO System Training

Name	
Hospital/Clinic	
City, State	
Telephone Number	

Successful completion and documentation of the requirements listed herein is proof that the operator listed above has met the training requirements for utilizing the Downstream System in the implementation of SSO_2 Therapy.

1. Prepare the AO System for use: • Open the oxygen valve and confirm the bottle contains ≥ 800 psi • Hang a one-liter bag of sterile physiologic 0.9% normal saline on the AO System IV pole • Ensure patient has anticoagulation regimen during administration (ACT ≥ 250 seconds) • Draw an arterial blood sample and analyze pO_2	5. Making patient connections: • Flush and prime the blood draw sample port and sheath sidearm with heparinized saline • Attach the blue connector to the sidearm of the arterial sheath • Verify all tubing connections on the AO Cartridge are secure and tight • Ensure there are no air bubbles in any of the tubing • When the return tubing is primed and bubble-free, make a wet-to-wet connection with the red return tubing connector and the Infusion Catheter hub
2. Load the AO Cartridge: • Insert the AO Cartridge, ensuring proper alignment • Plug the transducer cable into the transducer jack	6. Start and monitor AO flow: • Use a post-PCI systemic arterial pO_2 measurement to set the initial range on the AO System (≥ 80 mmHg) • Check the patient's pO_2 every 30 minutes and update the AO System as required
3. Install tubing through blood pump and detectors: • Insert draw-side tubing into the blood pump • Insert the return-side tubing through the bubble detector and flow detector	7. Terminate AO flow and blood flow: • After 90 minutes of treatment, hyperoxemic infusion will stop automatically indicating infusion is complete • Remove the Infusion Catheter from patient, disconnect tubing and remove AO Cartridge from the AO System • Turn off the oxygen valve
4. Insert the Infusion Catheter: • Remove all interventional devices after successful completion of the PCI procedure • Select and place the appropriate size sheath and guide catheter based on approach (ipsilateral vs. contralateral) selected • Position the Infusion Catheter at the targeted site under fluoroscopic guidance	8. Comments:

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☑ **Certificate Check-list:**

Requirement	Date Completed	Signature of Trainer	Comments (Attach additional pages if needed)
1. Instructions for Use		☐ TherOx Representative	
2. Operators Manual		☐ TherOx Representative	
3. Hands-on Demonstration of Device		☐ TherOx Representative	Physician optional
4. DownStream AO System Demonstration Set-up		☐ TherOx Representative	For Product Champion only

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